Drawing on public sources I put together a simple dataset with key variables analyzed by Foster & Rahmstorf (2011). Values of AOD are current through 2010, others through 2011 or early 2012. My analysis is limited to the overlap of AOD and TSI data: 12/1978 through 1/2011.

```
. describe ncdctemp year co2anom mei tsi1 aod

variable name   storage   display   format   value label   variable label
-------------------------------------------------------------------------------
ncdctemp        float     %9.0g     NOAA global anomaly v.1901-2000, C
year            int       %9.0g     Year
co2anom         float     %9.0g     gen co2anom = co2mauna - co2month
mei             float     %9.0g     Multivariate ENSO Index
tsi1            float     %8.0g     average irradiance in W/m2 (over period of day)
aod             float     %8.0g     Optical thickness at 550 nm, NASA
```

To make a simplified analog to the F&R model, for a grad-level reference book, I regressed temperature on year and 1-month lagged MEI, TSI and AOD, with ARIMA(1,0,1) errors.

```
. arima ncdctemp year L1.mei L1.tsi1 L1.aod, arima(1,0,1) nolog

ARIMA regression
Sample:       2760 - 3145                        Number of obs      =       386
Log likelihood =  396.0173                      Wald chi2(6)       =    572.92
Prob > chi2        =    0.0000
------------------------------------------------------------------------------
          |                 OPG
ncdctemp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cdcctemp     |
   year |   .0172228   .0013428    12.83   0.000     .0145909    .0198547
   mei  |   .0522328   .0099017     5.28   0.000     .0328258    .0716398
L1.    |   .0546155   .0172426     3.17   0.002     .0208205    .0884104
   tsi1 |   .0546155   .0172426     3.17   0.002     .0208205    .0884104
L1.    |   .0546155   .0172426     3.17   0.002     .0208205    .0884104
   aod  |  -1.234674   .3930424    -3.14   0.002    -2.005023   -.4643248
L1.    |  -1.234674   .3930424    -3.14   0.002    -2.005023   -.4643248
   _cons |  -108.5585   24.49044    -4.43   0.000    -156.5589   -60.55813
-------------+----------------------------------------------------------------
   ARMA      |
   ar  |  .7414296   .0652495    11.36   0.000     .6135429    .8693164
L1.    |  .7414296   .0652495    11.36   0.000     .6135429    .8693164
   ma  |  -.36823   .0904598    -4.07   0.000    -.5455279   -.1909321
L1.    |  -.36823   .0904598    -4.07   0.000    -.5455279   -.1909321
   /sigma |   .0867013   .002697    32.15   0.000     .0814152    .0919874
------------------------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided confidence interval is truncated at zero.
```
Residuals from the model above exhibit no autocorrelation at lags from 1 to 25 months.

```
predict residyear, resid
(2775 missing values generated)
corrgram residyear, lags(25)
```

<table>
<thead>
<tr>
<th>LAG</th>
<th>AC</th>
<th>PAC</th>
<th>Q</th>
<th>Prob&gt;Q [Autocorrelation]</th>
<th>[Partial Autocor]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.0109</td>
<td>-0.0110</td>
<td>0.04635</td>
<td>0.8295</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.0355</td>
<td>0.0361</td>
<td>0.53875</td>
<td>0.7639</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-0.0107</td>
<td>-0.0103</td>
<td>0.58326</td>
<td>0.9003</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.0302</td>
<td>0.0294</td>
<td>0.94169</td>
<td>0.9185</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>-0.0221</td>
<td>-0.0217</td>
<td>1.1342</td>
<td>0.9510</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>-0.0464</td>
<td>-0.0512</td>
<td>1.9837</td>
<td>0.9212</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>-0.0004</td>
<td>0.0014</td>
<td>1.9838</td>
<td>0.9607</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.0096</td>
<td>0.0130</td>
<td>2.0204</td>
<td>0.9804</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>-0.0816</td>
<td>-0.0850</td>
<td>4.6678</td>
<td>0.8623</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.0417</td>
<td>0.0441</td>
<td>5.3611</td>
<td>0.8658</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>0.0306</td>
<td>0.0384</td>
<td>5.7352</td>
<td>0.8904</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>-0.0177</td>
<td>-0.0277</td>
<td>5.8611</td>
<td>0.9229</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>0.0402</td>
<td>0.0465</td>
<td>6.5115</td>
<td>0.9255</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>0.0251</td>
<td>0.0252</td>
<td>6.7645</td>
<td>0.9434</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0.0097</td>
<td>-0.0040</td>
<td>6.8024</td>
<td>0.9629</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>-0.0267</td>
<td>-0.0200</td>
<td>7.0908</td>
<td>0.9715</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>-0.0780</td>
<td>-0.0802</td>
<td>9.5628</td>
<td>0.9209</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>-0.0185</td>
<td>-0.0300</td>
<td>9.7015</td>
<td>0.9412</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>-0.0175</td>
<td>0.0018</td>
<td>9.8263</td>
<td>0.9571</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>-0.0264</td>
<td>-0.0226</td>
<td>10.111</td>
<td>0.9661</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>-0.0711</td>
<td>-0.0812</td>
<td>12.183</td>
<td>0.9345</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>0.0161</td>
<td>0.0239</td>
<td>12.29</td>
<td>0.9511</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>0.0269</td>
<td>0.0266</td>
<td>12.587</td>
<td>0.9604</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>0.0898</td>
<td>0.0885</td>
<td>15.927</td>
<td>0.8907</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>0.0201</td>
<td>0.0253</td>
<td>16.095</td>
<td>0.9120</td>
<td></td>
</tr>
</tbody>
</table>

Discussion in the book will emphasize that this model is less sophisticated than F&R, notably in using a fixed 1-month lag structure instead of their optimal lags, and in lacking a trigonometric function they used to compensate for annual cycles. However, even this simplified version reaches roughly the same conclusions about the magnitude of the annual trend (e.g., NCDC 0.17/decade), and the relative importance of CO₂ as a driver (also see next page).
A parallel model using lagged monthly CO₂ anomalies (logarithms) from Mauna Loa yields similar results.

```
. arima ncdctemp L1.loganom L1.mei L1.tsi1 L1.aod, arima(1,0,1) nolog
ARIMA regression
Sample:  2760 - 3145                                  Number of obs      =       386
Log likelihood =  393.0942                                Wald chi2(6)       =    554.23
Log likelihood =  393.0942                                Prob > chi2        =    0.0000

------------------------------------------------------------------------------
            |                 OPG
ncdctemp    |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ncdctemp     |                  
loganom      |   8.515969     .65235    13.05   0.000     7.237386    9.794551
mei          |   .0548967    .009856     5.57   0.000     .0355793    .0742142
tsi1         |   .0564197   .0168047     3.36   0.001      .023483    .0893564
aod          |  -1.26735   .3742743    -3.39   0.001    -2.000914    -.533786
_cons        |  -76.80927   22.95986    -3.35   0.001    -121.8098   -31.80878
-------------+----------------------------------------------------------------
ARMA         |                  
ar          |    .7075207   .0712001     9.94   0.000      .567971    .8470703
ma           |   -.3218019   .094689    -3.40   0.001    -.507389   -.1362148
-------------+----------------------------------------------------------------
/ sigma      |    .0873625   .0027543    31.72   0.000     .0819642    .0927609
-------------+----------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided confidence interval is truncated at zero.
```